

REMARKS

This Amendment filed in reply to the Office Action dated October 4, 2007, is believed to be fully responsive to each point of rejection raised therein. Accordingly, favorable reconsideration on the merits is respectfully requested.

Additionally, Applicant respectfully requests that the Examiner acknowledged the date for foreign priority and confirm receipt of the certified copy of the Priority Document. Claims 1-7 and 9-18 are all the claims pending in the application and they all stand rejected.

Claim Rejections - 35 U.S.C. § 112

Claim 3 is rejected under 112 second paragraph because it is allegedly unclear what "symptom" stands for. Claim 3 has been amended by replacing "symptom" with "sign" to overcome this rejection. Applicant respectfully submits that the amendment should be entered because it merely adopts the Examiner's suggested change.

Claim Rejections - 35 U.S.C. § 103

Claims 1-9 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Takeo et al. (US 5,732,121 hereinafter "Takeo") in view of Paragios et al. (US 7,079,674 hereinafter "Paragios"). Applicant respectfully traverses this rejection.

Takeo relates to detection of abnormal patterns appearing in images and particularly attempts to distinguish true abnormal regions from false positive detections of abnormalities. In this regard, Takeo relies on the centralization of detected potential abnormal patterns to determine likely candidates and then submits such candidate regions to processing (Fig. 6) to determine which candidates are false positives. This analysis relies on establishing a circle of

radius R and a second of radius $4R/3$. The value of R will necessarily include regions both inside and outside the contours of a potential abnormal region because it is determined by taking the region A and determining $R = (A/\pi)^{1/2}$ and centered at the center of gravity point of the area A . Variations of statistical data are calculated in the region bounded by R and the annular region bounded by R and $4R/3$. Low variations will confirm an abnormal region, and larger variations will indicate a false positive. *See* cols. 16-17.

Paragios provides merely a method for segmenting cardiac images. Such segmented images provide the benefit of a strong diagnostic power. The iteration in Paragios pointed to by the Examiner, is “to determine the actual boundaries of the inner and outer walls...of the myocardium of the left ventricle.” (Col. 21 ln. 66 to col. 22 ln. 1). Thus, the boundaries of a segment of the left ventricle of the heart are being determined. The determination of the boundaries depends on multiple criteria, including similar intensity determinations, a time-varying model due to heart movement. *See* cols. 13-15. The criteria of Paragios differs significantly from that of Takeo.

The Examiner correctly concedes that Takeo does not include the inner/outer region including an entire outline of the candidate regions. However, the Examiner cites Paragios to make up for the deficiency. The Examiner contends that it would be obvious to make the combination in order to allow more accurate determination of candidate regions. Applicant submits that this rejection is not supported for multiple reasons.

The references relate to fundamentally different types of medical analysis. Takeo seeks to identify abnormalities within a medical image and Paragios seeks to accurately delineate the regions of the ventricle of a beating heart. Takeo relies on determinations of centralization and statistical analysis of false positive candidates. By contrast, Paragios relies on modeling relative

to an apriori known pattern of intensity distributions coupled with a time varying analysis. The analyses in each do not lend themselves to a combination with each other.

As a related matter, the Examiner's proffered motivation to combine the references to provide a more accurate determination of candidate regions is also incorrect. Takeo relies on a boundary condition set by a radius R , which necessarily partially overlaps the candidate area due to irregularities at the edge portion, causing some parts of the contour to fall within the radius R and some parts of the contour to fall outside. This designation is important in order to better delineate the statistics used to determine a true abnormality (having low variation) from a false positive (having higher variation). If the inner radius were drawn to completely include the contour, the difference between the variances tend to come close together. In particular, there will be more uniformity in values in the regions delineated by R and the annulus bounded by R and $4R/3$. This makes it more difficult to distinguish a low variation from a high variation, thereby making the detection less accurate rather than more accurate as the Examiner contends. Therefore, Takeo actually teaches away from its combination of Paragios and also teaches away from claim 1.

In view of the above, claim 1 should be patentable. Claims 2-6 are believed be patentable at least because of their dependency from claim 1. Claims 7 and 9 should be patentable at least for reasons similar to claim 1 because claims 7 and 9 recite features that are similar to those of claim 1.

Furthermore, the Examiner has failed to address the arguments presented with respect to claim 4. Claim 4 recites in part:

a density pattern extracting means, for extracting
density patterns, which are present within unit pixel groups

that constitute the inner/outer outline images, extracted by the inner/outer outline image extracting means;
a presence frequency calculating means, for judging which of the density patterns the unit pixel groups of the inner/outer outline images are similar to, and calculating presence frequencies by counting the presence of the similar density patterns within the inner/outer outline image;

Therefore, according to the claimed invention as recited in claim 4, the unit pixel groups are regions in the inner/outer outline image extracted from the candidate region. Further, each of the unit pixel groups includes a plurality of pixels, and the unit pixel groups are separately judged to analyze the inner/outer outline image. In contrast, in Takeo, the areas in the donut-shaped second region are not analyzed separately. Therefore, Takeo does not teach extracting density patterns, which are present within unit pixel groups that constitute the inner/outer outline images and judging which of the density patterns the unit pixel groups of the inner/outer outline images are similar to. Accordingly, Claim 4 is patentable for this additional reason.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880.

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Respectfully submitted,

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